Inspection Notes/Record Copy

William P. Ellis/djd

Union Carbide ~~Chemicals~~ Olefins Company
Division of Union Carbide Corporation
South Charleston 3, West Virginia

License No. 45-260-2 (thru Amendment #12 dated December 17, 1962)

I. General Information

1. The Union Carbide Olefins Company's program involving the use of cesium-137 sources for density gauges and level indicators was originally inspected on May 23, 1957, Two items of noncompliance were noted which involved the possession of a 200 mc cobalt-60 source which was not licensed and the licensee's failure to post a radiation area. The cobalt-60 source was returned to ORNL on September 18, 1957, and the radiation area was subsequently posted.

2. This unannounced reinspection (1) was conducted on April 23-25, 1963, by W. P. Ellis of Region II, accompanied by Mr. Jim Ellison of the West Virginia State Health Department. No items of noncompliance were noted.

3. Union Carbide's programs under Licenses #47-260-3, -4, -6, -7, and 47-4373-1 were inspected simultaneously and the results are reported separately. Mr. W. J. Skraba, Chairman of the Isotopes Committee; Mr. N. H. Ketcham, and Fred Williams, Radiological Safety Officers; and Mr. H. T. Sessions, Instrument Engineer and designated user, were interviewed and the substance of the information supplied by them and the observations of the inspector are contained in this report.

II. Organization

4. As noted in Annex A, the Union Carbide Corporation is composed of several companies, and its Technical Center at South Charleston, performs research for several groups. The Technical Center consists of seven major departments as follows: Chemical Department, Development Department, Olefins Research Department, Olefins Engineering Department, Chemical Engineering Department, Textile Fiber Department and the Design and Construction Department. The administration of the Technical Center is primarily under the Chemicals and Olefins Companies.

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5. Mr. Sessions is in the Special Instrument Development group and reports to the Head of the department, Mr. L. J. Rogers. Mr. N. H. Ketcham and Fred Williams report through the Medical Department and the Director of Special Projects. Mr. Ketcham had four years experience in the AEC plants at Oak Ridge, Tennessee, and Mr. Fred Williams had 12 yearseexperience in the same installations before they were employed as Radiological Safety Officers at the Technical Center.

III. Procedures

6. All requests for radioactive materials at the Technical Center must be forwarded totthe Radiological Materials Committee for approval. Such requests state the operation planned, the amount of material to be used, handling techniques, storage, and instrumentation. Only when these requests are approved will the Purchasing Department submit the order to a vendor.

7. When material arrives at the Receiving Department, it is set aside and the user is notified immediately. The user is required to inspect the shipment to ascertain its condition. A radiation survey is made and recorded. When the material is accepted, the Safety Division and Fire Department are notified. The notification states the type of material, amount received, location, and the name of the user. (See Annex B). When the user receives a sealed source and makes the installation, a survey and a leak test are performed and the results are recorded in the form attached as Annex C. In many instances additional lead shielding is placed around the source container in order to minimize the radiation levels.

8. The chief of the local fire department had a formal course in radiological safety which included the use of instruments, personnel monitoring, and techniques for confining radioactive materials. He is a local Civil Defense Director. Emergency instructions to the fire department provide that sealed sources which may be involved in a fire should be roped off and the designated user should be notified. A hazardous work permit as shown in Annex D is used when maintenance employees must work on a system where a sealed source is located. The permit states that the source container has been closed, and provides special instructions as needed.

IV. Equipment and Facilities

9. The Union Carbide Corporation has a Technical Center constructed on a tract of land which contains several hundred acres and is located on a mountain above the city of South Charleston, West Virginia. This area is enclosed by a chain link fence and the portals are manned by guards on all shifts. The research complex contains six major multi-story structures which are about 500 yards apart. These facilities house administrative, medical and cafeteria service groups as well as laboratory and pilot plant operations. The site also has numerous auxiliary buildings.

10. The licensee maintains the following instruments in the Technical Center:

1 RCL, Model 1, scaler with GM tube detector and counting well
1 RCL, Model 10400, End Window GM Tube monitor
2 Tracerlab, Laboratory monitor, Model SU3-D with GM tube detector, range 0 to 20,000 c/m
1 Instrument Calibration Assembly with 1 mc cobalt-60 source (License No. 47-260-4) and sliding carrier to position instrument
1 Curtiss-Wright, Model 305 F, with GM tube detector, range 0-50 mr/hr
4 Jordon Cutie Pies, Model AGB-10K, Range 0-10,000 mr/hr
3 Tracerlab GM Tube Survey Meters, Model SU-14, Range 0-25 mr/hr
1 Universal Atomics GM Survey Meter, Model CDV-700, range 0-50 mr/hr
1 Keleket Scaler, Model K-281, with counting well and GM Tube Detector
1 Victoreen CDV-720 Ion Chamber Survey Meter, Range 0-500 r/hr
30 Direct Reading Pocket Dosimeters, Range 0-200 mr/
1 Nuclear-Chicago, Single Channel Analyzer, Model 132 B Scaler

V. Material Receipt, Inventory and Disposal

11. The licensee maintains records of material received showing the type of material, amount, date of receipt, and the supplier. A review of the records showed that the following materials have been received and were in his inventory at the time of the inspection:

Cesium-137 Sources

Activity	Building and Location	Plant
200 mc	745 Storage	Technical Center
200 mc	745 Storage	" "
200 mc	745 Storage	" "
200 mc	Bldg. 421	South Charleston
150 mc	Bldg. 414 #2 unit	" "
150 mc	Bldg. 421 Lab	" "
500 mc	745 Storage	Technical Center
20 mc	Bldg. 421	South Charleston
20mc	Bldg. 414 #1 unit	" "
20 mc	745 Storage	Technical Center
20 mc	414 #1 Unit	South Charleston
20 mc	414 #1 Unit	" "
50 mc	745 Storage	Technical Center
50 mc	414 #1 Unit	South Charleston
50 mc	414 #1 Unit	" "
100 mc	745 Storage	Technical Center

Activity	Building and Location	Plant
150 mc	414 #2 Unit	South Charleston
150 mc	745 Storage	Technical Center
150 mc	" "	" "
1000 mc	414 #7 Unit	South Charleston
450mc	745 Storage	Technical Center
1750 mc	" "	
500 mc	Cellosize Unit	Institute
500 mc	Cellosize Unit	"
1000 mc	Bldg. 771 #5 Cell	Technical Center
150 mc	Bldg. 414 #2 Cell	South Charleston
150 mc	" " " "	" "

12. One 200 mc cobalt-60 source was returned to the Oak Ridge National Laboratory on September 18, 1957, as a result of the last inspection and no other disposals have been made.

VI. Personnel Monitoring

13. The licensee maintains a personnel monitoring program utilizing film badges which are supplied by Nuclear-Chicago on a monthly basis. The licensee maintains all the information necessary to satisfy the requirements of AEC Forms 4 and 5. A review of these records showed that the maximum monthly exposure was 20 mrem and the maximum quarterly exposure was 44 mrems. Mr. Sessions stated that all employees who work with the sealed sources wear direct reading dosimeters and these results are recorded daily. A quarterly report of the dosimeter readings is forwarded to the Medical Department for inclusion in ~~their~~ each employee's records. The maximum monthly dosimeter reading was 41 mrem. All employees are more than 18 years of age.

14. Employees wear direct reading dosimeters while installing sealed sources or when making repairs or leak tests of this equipment. The maximum value recorded for one job was 5 mrem.

15. The licensee has a clinical urinalysis and ~~blood test~~ program which is performed semi-annually. Mr. Williams stated, however, that these tests were not performed primarily for the detection of personnel exposure to radioactive materials.

VII. Leak Tests

16. The licensee performs leak tests on all sealed sources at the time they are received. A record is made of each source at this time and a routine leak tests schedule is established. Subsequent leak tests are made on a six month basis or a three year basis as required for each particular source. A review of the leak test records showed that tests were made within the required schedule and the results were leas than .005 μc.

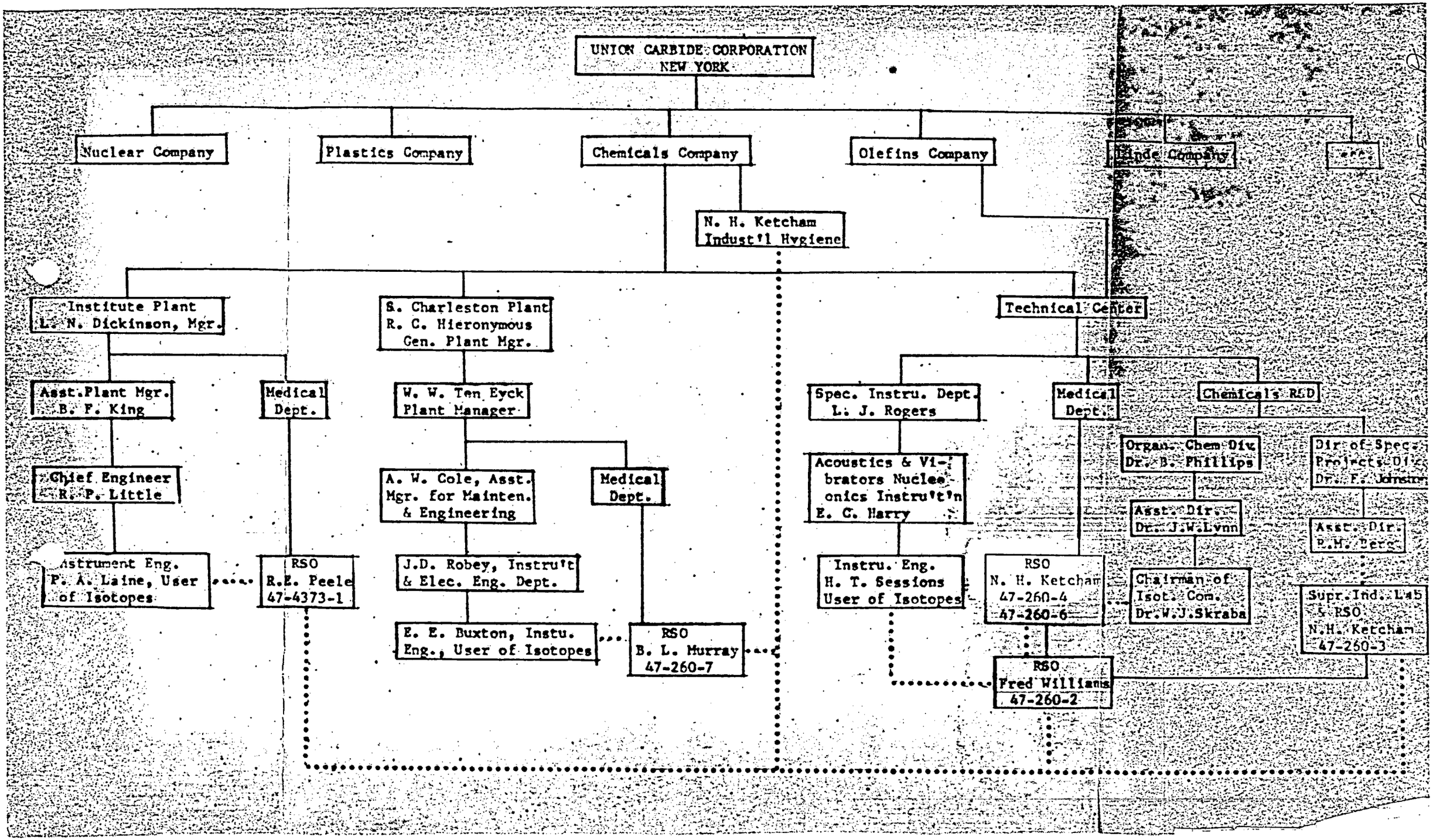
VIII. Surveys

17. The licensee records surveys of sealed sources which are made at the time of installation and subsequent surveys are made at the time leak tests are made or when a source is relocated. A review of these records showed that all ~~survey values~~ radiation levels were less than 5 mr at one foot from the container.

IX. Posting and Labeling

18. All source containers were labeled with a sign containing the conventional radiation symbol of magenta on yellow and the words "Caution - Radioactive Materials" in accordance with 10 CFR 20.203(f)(1). The label also showed the type of material, amount, and date of measurement in accordance with 20.203(f)(4) of the regulations. All areas in which radioactive materials were stored were posted with a sign containing the conventional radiation symbol in magenta on yellow and the words "Caution Radioactive Materials" in accordance with 20.203(e)(1).

19. Form AEC-3, "Notice to Employees", were posted in the Special Instrument shop where all employees may observe a copy.


UNION CARBIDE CORPORATION
NEW YORK
Nuclear Company
Plastics Company
Chemicals Company
Olefins Company
Linde Company
etc.
N. H. Ketcham
Indust'l Hygiene
Institute Plant
L. N. Dickinson, Mgr.
S. Charleston Plant
R. C. Hieronymous
Gen. Plant Mgr.
Technical Center
Asst. Plant Mgr.
B. F. King
Medical Dept.
W. W. Ten Eyck
Plant Manager
Spec. Instru. Dept.
L. J. Rogers
Medical Dept.
Chemicals R&D
Chief Engineer
R. P. Little
A. W. Cole, Asst.
Mgr. for Mainten.
& Engineering
Medical Dept.
Acoustics & Vi-
brators Nuclee-
onics Instru't'n
E. C. Harry
Organ. Chem Div.
Dr. B. Phillips
Dir of Spec.
Projects Div.
Dr. F. Johnstr
Asst. Dir.
Dr. J.W.Lynn
Asst. Dir.
R.H. Berg
Instrument Eng.
P. A. Laine, User
of Isotopes
RSO
R.E. Peele
47-4373-1
J.D. Robey, Instru't
& Elec. Eng. Dept.
Instru. Eng.
H. T. Sessions
User of Isotopes
RSO
N. H. Ketcham
47-260-4
47-260-6
Chairman of
Isot. Com.
Dr.W.J.Skraba
Supr. Ind. Lab
& RSO
N.H. Ketcham
47-260-3
E. E. Buxton, Instu.
Eng., User of Isotopes
RSO
B. L. Murray
47-260-7
RSO
Fred Williams
47-260-2

RADIATION SURVEY - PLANT 51

Location _____ Sample Date _____

Supervisor _____ Sampled by _____

Radiation _____ Type of Test _____

Location of Source _____

Required Survey Frequency _____ Meters Used _____

Work Hazard Permit _____ Gas Test _____

Degree	Distance From Source To Meter	Mr/hr Reading	Surface mr/hr
Background			
0°-Recv'r			
45°			
90°			
135°			
180°-Back			
225°			
270°			
315°			
Top			
Bottom			
Wipe Test	Counts/5 min		
Background			
Top of Source Holder			

Remarks:

ANNEX 13

Page 1

NEW LOCATION ______________________ OLD LOCATION ______________________

PERSON MAKING TRANSFER ______________________ TYPE OF SOURCE ______________________

IDENTIFICATION NUMBER ____________ TYPE HOLDER ____________ ACTIVITY (Millicuries) ____________

WIPE TEST CERTIFIED ______________________ PHYSICAL DESCRIPTION ______________________

RESPONSIBLE SUPERVISOR ______________________ PHONE ____________ USE ____________

PERSON RESPONSIBLE FOR TESTING ______________________ PHONE ____________ REQ. TEST. FREQ. ____________

PERSON RESPONSIBLE FOR LICENSE ______________________ PHONE ____________

REQUISITION NUMBER ______________________ VENDOR ______________________

DATE RECEIVED ____________ DATE PLACED IN STORAGE ____________ DATE TRANSFERRED ____________

RECORD OF TESTS:

	WIPE TEST DUE	WIPE TEST	MONITORED	REPORTED
DATE:				

COMMENTS ____

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Copies to

South Charleston		Institute	
E. E. Buxton	82-707	P. A. [illegible]	57
L. L. Murray	N8-[illegible]	W. H. Ketchum	770-306
[illegible]	770-306		

ADIATION SURVEY DATA SHEET
ECHNICAL CENTER SERVICES
EDICAL DEPARTMENT

SOURCE NUMBER	SURVEY DATE

OURCE INFORMATION

OURCE TYPE	ACTIVITY	TYPE HOLDER	REQUIRED SURVEY FREQUENCY
LANT LOCATION	BUILDING NUMBER	ROOM NUMBER	PERSON RESPONSIBLE
AZARDOUS WORK PERMIT	GAS TEST	TYPE SIGNS	

URVEY INFORMATION

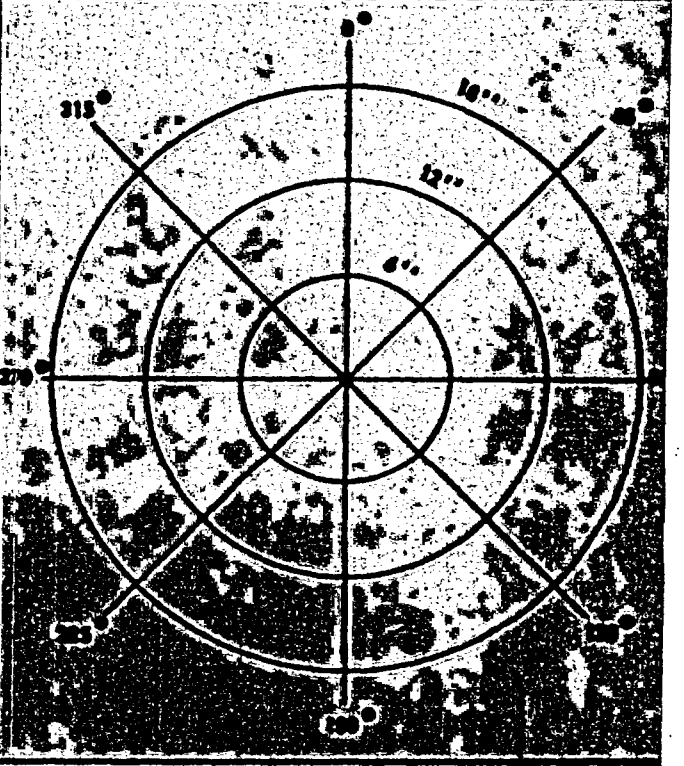
TYPE METERS USED

OURCE POSITION ☐ ON ☐ OFF	PIPE TEST	SURVEYED BY

METER READINGS

LOCATION	DISTANCE FROM SOURCE HOLDER TO METER	MR/HR

EXPOSURE CURVE



EMARKS

ANNEX

DUPLICATE Retained by shift personnel approving.
Pass on to shift relief.

HAZARDOUS WORK PERMIT

Must be properly filled out and approved, and responsible supervision provided by operating and craft personnel when flame or other possible ignition source is to be used in a restricted area or where entry is to be made into equipment for any reason (and in some instances where piping is opened), except: (1) cleaning "Vinylite" autoclaves by "Vinylite" Department personnel, (2) tank car cleaning by Shipping Department personnel, or (3) barge cleaning by Refinery Department personnel, all three of which are covered by r[illegible] operating procedures.

See front cover of form pad for complete instruction.

Location: Describe work: .....

Between the hours of: ..... a.m. / p.m. to ..... a.m. / p.m. Date: ..... Charge or W. O. No. .....

Requested by: ..... Dept.: .....

CLASS "A" HAZARDS

- ☐ Entry of operating equipment for any reason except: (1) cleaning "Vinylite" autoclaves, (2) tank cars by Shipping Department personnel, or (3) barges by Refinery personnel.
- ☐ Entry of sewers.
- ☐ Blowpipe or welding torch (any kind).
- ☐ Electrical or electronic equipment — not vapor-proof or explosion-proof — saw, drill, welding machine, or otherwise.
- ☐ Radiation Monitor — nonexplosion-proof electronic equipment
- ☐ Lead, soldering, or tar pot.
- ☐ Sandblasting.
- ☐ Power operated grinder.
- ☐ Jack hammer or chipping hammer.
- ☐ To open vapor globe or any electrical device (except by electrician).

CLASS "B" HAZARDS

- ☐ Movement of internal combustion engine into or through "restricted area."
- ☐ Hand drill, saw, or other hand tool work.
- ☐ Roofing tar (pouring hot).
- ☐ Power tools not listed under Class "A" that may be used for heat exchanger tube cleaning.

OTHER CLASS "A" OR "B" HAZARDS

- ☐ Explain .....

RECOMMENDED PREPARATIONS AND PRECAUTIONS (to be checked and signed by operating foreman).

- ☐ Blank or disconnect all connecting lines ..... _____
- ☐ Lock out electrical switches ..... _____
- ☐ Clean or wash with ..... _____
- ☐ Keep wet ..... _____
- ☐ Steam for _____ hrs. or to _____ °F. ..... _____
- ☐ [illegible] with _____ ..... _____
- ☐ Turn Radioactive source in "safe position," or remove (to be signed by Plant Instrument Foreman) ..... _____
- ☐ Test for Flammable Gases: ☐ Continuous ☐ Spot Check — Results: ___Neg. ___Pos. by ..... _____
- ☐ Test for Copper Acetylide — Results: ___Neg. ___Pos. by ..... _____
- ☐ Test for Toxic Gases _____ (SPECIFY GAS) — Results: ___Neg. ___Pos. by ..... _____
- ☐ Contamination test for Radioactive Materials — Results: ___Neg. ___Pos. (to be signed by Radiation Licensee representative or Radiation Protection Officer) _____
- ☐ Ventilate — Results: ___Neg. ___Pos. by ..... _____

SAFETY EQUIPMENT TO BE USED

- ☐ Fresh Air Masks
- ☐ Special Goggles
- ☐ Life Lines
- ☐ Full Face Gas Masks
- ☐ Spark-Resistant Tools
- ☐ Protective Clothing
- ☐ Fresh Air Blower
- ☐ Portable Fire Extinguisher
- ☐ Water or Fire Hose (Chg'd _____)
- ☐ Personal Dosimeters _____
- ☐ Other _____ _____

Approval is granted for the above operation, subject to the following conditions: .....

Operating supervision ..... must be present while Class "A" work is in progress.
(NAME)

Countersigned: .....
(AREA SHIFT FOREMAN OR GEN. FOREMAN)

Signed: .....
(CLASS "A" - DEPT. HEAD) (SEE INSTRUCTIONS)
(CLASS "B" ONLY - CHIEF OPERATOR)

Countersigned: .....
(AREA MAINT. FOREMAN, SENIOR INSPECTOR, OR CONSTRUCTION SAFETY INSPECTOR)

COMPLETED: Time ..... a.m. / p.m. Date ..... 19.... Signed: .....
(JOB FOREMAN)

Signed: .....
(AREA SHIFT FOREMAN ON DUTY)

Following proper filling out and approval, distribution of permit shall be as follows:
(1) Original (white) copy must be in hands of job foreman before work is started and during its progress. This original copy must be signed and returned to the Fire Station at the completion of the work, or when permit expires.
(2) Duplicate (yellow) copy shall be retained by shift personnel approving permit, and passed on to relief at shift change so that oncoming shift relief may be familiar with work in progress and assign the necessary supervision.
(3) Triplicate (pink) copy is for the information and use of Operating supervision.